

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A liquid ejecting apparatus comprising:

a liquid ejecting head having a plurality of nozzle openings for ejecting liquid drops arranged in line, wherein:

said liquid ejecting head has a flow path unit having a plurality of pressure chambers respectively interconnected to said plurality of nozzle openings, a plurality of elastic walls for respectively forming one face of each of said plurality of pressure chambers, and a nozzle plate where said plurality of nozzle openings are formed and a piezoelectric actuator unit which includes a plurality of piezoelectric vibrators respectively joined to said plurality of elastic walls via insular parts, deforms said elastic walls by deformation of said piezoelectric vibrators, and changes the volume of said pressure chambers,

said plurality of piezoelectric vibrators are respectively formed by alternately laminating piezoelectric material layers and electrode layers and have active parts capable of performing piezoelectric deformation which are joined to said elastic walls, and

said piezoelectric actuator unit further has a pair of unit fixing parts installed on both sides of said active parts in a vibrator width direction perpendicular to an arrangement direction of said plurality of nozzle openings, and said pair of unit fixing parts are joined to parts of said

flow path unit other than said plurality of elastic walls of said flow path unit, thereby said piezoelectric actuator unit is fixed to said flow path unit,

wherein at least one of said pair of unit fixing parts comprises a plurality of inactive parts incapable of performing piezoelectric deformation formed integrally with said active parts in said vibrator width direction as a part of each of said plurality of piezoelectric vibrators,

wherein said piezoelectric material layers and said electrode layers are laminated perpendicularly to said nozzle plate and said piezoelectric vibrators vibrate in a lamination direction of both layers, and

wherein at least one of said pair of unit fixing parts is joined to an end of said active part in said vibrator width direction and parts of said fixing members joined to said ends of said active parts are formed integrally with said plurality of piezoelectric vibrators in a comb-teeth shape.

2. (canceled)

3. (previously presented) A liquid ejecting apparatus according to Claim 1, wherein at least one of said pair of unit fixing parts comprises a fixing member which is formed as a separate member from said plurality of piezoelectric vibrators and is joined to said plurality of piezoelectric vibrators.

Amendment under 37 C.F.R. § 1.116
U.S. Application No. 10/676,256

4. (original) A liquid ejecting apparatus according to Claim 3, wherein said fixing member is joined to said plurality of piezoelectric vibrators via a base member joined to said plurality of piezoelectric vibrators.

5. (original) A liquid ejecting apparatus according to Claim 4, wherein said plurality of piezoelectric vibrators are respectively formed independently and are integrally fixed by said base member.

6. (original) A liquid ejecting apparatus according to claim 4 or 5, further comprising a tape carrier package electrically connected to said plurality of piezoelectric vibrators, wherein said tape carrier package includes an integrated circuit for driving said plurality of piezoelectric vibrators and a rear of said integrated circuit is fixed to said base member at least partially.

7. (previously presented) A liquid ejecting apparatus according to Claim 4, wherein said base member is formed by free-cutting ceramics.

Claim 8 (canceled).

9. (previously presented) A liquid ejecting apparatus according to Claim 1, further comprising a plurality of said piezoelectric actuator units, wherein:
a plurality of nozzle rows composed of said plurality of nozzle openings are formed, and

Amendment under 37 C.F.R. § 1.116
U.S. Application No. 10/676,256

said piezoelectric actuator units are respectively arranged for each nozzle row.

10. (previously presented) A liquid ejecting apparatus according to Claim 1, wherein:
said plurality of elastic walls comprise a part of an elastic plate covering all of said
plurality of pressure chambers, and
a plurality of insular movable thick parts which are formed in correspondence with said
plurality of pressure chambers and to which respective said active parts of said plurality of
piezoelectric vibrators are joined, first fixed thick parts to which said inactive parts of said
piezoelectric vibrators are joined, and second fixed thick parts to which said unit fixing parts are
joined are installed on a face of said elastic plate on a side of said actuator unit.

11. (previously presented) A liquid ejecting apparatus according to Claim 1, wherein a
total width of said pair of unit fixing parts in said vibrator width direction is wider than a width
of said active part in said vibrator width direction.

Claim 12 (canceled)

13. (previously presented) A liquid ejecting apparatus according to Claim 1, wherein:
said plurality of nozzle openings are formed in two rows and are staggered between said
nozzle rows, and

Amendment under 37 C.F.R. § 1.116
U.S. Application No. 10/676,256

each of said plurality of piezoelectric vibrators includes a half on one side in said vibrator direction and a half on the other side in said vibrator width direction, either of said half on one side and said half on the other side forms said active part, and the other half forms an inactive part incapable of performing piezoelectric deformation, an arrangement of said active part and said inactive part is opposite between adjacent piezoelectric vibrators, and said active parts are arranged in correspondence with said nozzle openings.